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Social Support in Higher Education:

Causal Evidence from Portugal

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Abstract: This paper evaluates the impact of two financial aid policies in Portuguese higher education: the DGES needs-based scholarship and the +Superior Program. Using quasi-experimental methods—a Fuzzy Regression Discontinuity Design and a staggered Difference-in-Differences approach—the analysis finds that the DGES grant reduces dropout rates by 1.3 to 1.7 percentage points, improves ECTS completion by 1.9 percentage points and increases the likelihood of graduation by approximately 3 percentage points. In contrast, while the +Superior Program increases enrollment, it has limited impact on student mobility and may negatively influence the academic and socioeconomic composition of the student body.

Keywords: Need-Based Financial Aid; Educational Equity; Academic Success; Territorial Cohesion

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1 Introduction

In recent decades, Portugal has witnessed significant progress in expanding access to higher education (HE), with the tertiary attainment rate for individuals aged 30 to 34 reaching 41% in 2020, surpassing the EU's Education and Training 2020 benchmark of 40%. However, despite this advancement, the Portuguese HE system continues to face notable challenges. Regional disparities, financial barriers, and moderate dropout rates persist—particularly among students from socioeconomically disadvantaged backgrounds.

From a theoretical perspective, these challenges underscore the relevance of Human Capital Theory, which conceptualizes education as an investment that enhances individual productivity and contributes to economic growth (Becker, 1993; Schultz, 1961). In this framework, education yields both private and public returns—improving earnings potential while also fostering civic participation, technological progress, and intergenerational mobility (Gennaioli et al., 2013; Arrow, Bowles, & Durlauf, 2000). Market imperfections, however, often prevent optimal investment, particularly among low-income students, thereby justifying public intervention (Becker, 1993; Dynarski, 2023).

To address these equity gaps, the Portuguese government has introduced two main policy tools: the Directorate-General for Higher Education (DGES) needs-based grant, which provides financial support to low-income students, and the +Superior Program, which incentivizes enrollment in less populated or lower-demand regions.

This paper provides a empirical evaluation of these two financial aid mechanisms. A Fuzzy Regression Discontinuity Design (RDD) is applied to estimate the causal impact of the DGES grant on academic outcomes among first-year students. For the +Superior Program, a Difference-in-Differences (DiD) strategy is used to assess the policy's effects on enrollment and student composition, exploiting the staggered implementation across institutions.

The relevance of this study lies not only in measuring academic outcomes but also in informing policy choices. In a context of constrained fiscal resources and increasing expectations for inclusive growth, evidence-based design of financial aid is more important than ever. The findings of this research aim to support the development of targeted, efficient and fair policies that ensure that HE can serve as a driver of inclusion and regional cohesion in Portugal.

This study is structured as follows. Section 2 presents a review of the literature on the impact of financial aid programs in HE. Section 3 contextualizes the Portuguese HE system, discussing its institutional structure, regional and socioeconomic inequalities and the design of the DGES and +Superior financial aid programs. Section 4 analyzes the effects of the DGES grant on the academic performance of first-year students, detailing the data, sample selection process, the Fuzzy Regression Discontinuity Design methodology and robustness checks. Section 5 turns to the evaluation of the +Superior Program, detailing the data, methodology, and Difference-in-Differences results. Finally, Section 6 concludes with a summary of findings and their implications for policy and future research.

2 Literature Review

Higher education influences individuals' lives, shaping their economic prospects, career trajectories and personal development. Investments in human capital generate significant private and social benefits, motivating many countries to adopt policies that expand access to tertiary education. Among these measures are needs-based and merit-based scholarships, tuition subsidies, student loans and programs enabling students to work part-time to fund their studies. The effectiveness of needs-based scholarship programs in higher education has been a critical area of research globally, with significant implications for equity, access and academic outcomes.

In Portugal, the DGES administers a needs-based scholarship program targeting low-income

students. This program seeks to reduce financial barriers, ensure equitable access to HE and promote academic success. Recipients must meet eligibility requirements, including, from the second year onward, completing at least 36 ECTS annually. Combining need and merit criteria, the program incentivizes academic engagement while addressing socioeconomic inequities.

A study by Guthmuller and Meroni (2022) evaluated the DGES grant using regression discontinuity and difference-in-differences methods. For first-year students, eligibility based on income allowed causal identification near the threshold. For second-year students, they focused on the 36 ECTS completion requirement to assess continued eligibility. They found that the program reduces dropout rates at critical points, such as the end of the first and second years. Additionally, it increases the likelihood of students completing both the 36 ECTS required for renewal and all enrolled ECTS. It also improves on-time and overall graduation rates. Multi-year recipients benefit more, as continued support fosters better outcomes. The merit-based renewal condition further encourages academic effort and sustained performance.

Financial aid systems in Europe and the United States differ in design and focus. European models, such as those in Portugal, typically focus on needs-based criteria to promote equity. Arendt (2013) evaluated a reform in Denmark using a cohort comparison design, controlling for student, parental and labor-market characteristics, and found that public aid significantly reduced dropout and improved graduation timelines, particularly among low-income students. Similarly, Sneyers et al. (2016) used cross-sectional and within-university propensity score matching to show that needs-based grants at five Italian universities increased first-year credit accumulation, reduced dropout and improved on-time graduation.

In contrast, U.S. programs often combine need and merit, with a stronger emphasis on the latter. Dynarski (2003), using a differences-in-differences methodology and applying proxy measures for benefits linked to childhood parental loss found that the elimination of the Social

Security Student Benefit Program reduced college attendance by more than a third. Bettinger (2004), applying regression discontinuity and instrumental variables, found that Pell Grant[2] slightly reduced first-year dropout by 1.4 to 4 percentage points at Ohio University. However, merit-heavy systems may disadvantage low-income students facing structural barriers to performance (Agasisti et al., 2022).

Balancing merit- and needs-based financial aid is a central policy concern. Needs-based programs aim to promote equity by targeting support to low-income students. In Portugal, the DGES grant reflects this approach and has been shown by Guthmuller and Meroni (2022) to reduce dropout and improve graduation. Similar benefits were observed in Denmark and Italy (Arendt, 2013; Sneyers et al., 2016). However, merit-based aid, while promoting academic excellence, can exacerbate inequities if stringent eligibility requirements disproportionately exclude disadvantaged students. Agasisti et al. (2022), using a differences-in-differences method, evaluated an Italian reform that raised the first-year credit requirement from 25 to 35 out of 60. The policy improved performance mainly among high- and medium-ability students, while discouraging lower-ability students. Portugal's 36 ECTS threshold under DGES offers a more inclusive model that encourages academic effort without creating excessive barriers.

Hybrid models that combine need and merit criteria may optimize both equity and efficiency. Dynarski and Scott-Clayton (2013), in a literature review focusing on studies that utilize rigorous causal research designs, argue that well-calibrated merit components can enhance academic outcomes without excluding disadvantaged students. The DGES program exemplifies such an approach by encouraging academic effort without imposing undue barriers on disadvantaged students.

A robust body of research highlights the critical role of financial aid in promoting equity and expanding access to higher education. Needs-based grants have consistently demonstrated

[2] A U.S. need-based grant awarded to low and moderate income students pursuing HE at accredited institutions.

effectiveness in increasing enrollment and reducing dropout rates, particularly among socioeconomically disadvantaged students. Hybrid models that incorporate merit-based components — such as Portugal's DGES grant — offer a promising approach by simultaneously addressing financial constraints and incentivizing academic engagement, thereby enhancing both equity and educational outcomes.

3 The Case of Portugal

This section contextualizes the Portuguese HE system, focusing on its structural features, regional disparities and the public policies introduced to address these challenges. It outlines the institutional framework of HE in Portugal and discusses the DGES and +Superior programs as targeted responses to both financial and territorial inequities.

3.1 System Structure and Enrollment Trends

Portugal's HE system is binary, comprising universities and polytechnics. Universities are research-oriented and offer bachelor's, master's, integrated master's and doctoral degrees, while polytechnics emphasize professional training through short-cycle programs (Professional Higher Technical Programmes(CTeSPs)), bachelor's and second-cycle master's degrees (OECD, 2022).

Enrollment in HE has expanded significantly in the past decade, reaching its highest level in 2020/21. This growth, amounting to a 15% increase in full-time students since 2014/15, was driven largely by the introduction of CTeSPs and alternative admission pathways for older students (aged 23 and over). Public institutions have led this expansion and now account for over 80% of total enrollment, whereas private HE institutions have seen their share decline to 16% (OECD, 2022).

3.2 Regional and Socioeconomic Inequalities

Despite increased participation, regional disparities remain pronounced. The Norte region has experienced the most significant growth in enrollment, while regions like Alentejo, the Algarve and the Azores have seen declines. The Lisbon Metropolitan Area consistently accounts for around 37% of total enrollments. Moreover, metropolitan institutions disproportionately attract local students. For instance, 74% of students enrolled in institutions in Lisbon are local residents, compared to only 44% in Coimbra (OECD, 2022).

Socioeconomic inequalities are also evident. Students from families with lower educational attainment are more likely to enroll in polytechnic institutions and choose fields such as education and business sciences. University students are more often from higher socioeconomic backgrounds, reflected in the lower share of grant recipients in universities (28.14%) compared to polytechnics (37.38%) (EDULOG, 2019).

Completion rates further highlight systemic inefficiencies. Between 2011/12 and 2014/15, only half of first-year students in three-year bachelor's programs completed their degree within four years. (Engrácia et al., 2018). Despite these outcomes, Portugal's overall tertiary graduation rate remains above the OECD average (OECD, 2020).

3.3 The DGES Grant

The DGES grant is the principal financial aid instrument. It provides annual support to students from low-income households, with eligibility based on income in the first year and a 36 ECTS credit requirement in subsequent years. The grant may also include subsidies for housing and transport. In 2023/24, 82 452 students received the grant (DGES, 2024).

However, a critical issue concerns the declining real value of scholarships. Between 2013/14 and 2023/24, the gross value of the average DGES grant fell from approximately €2,270 to

€1,300, while the net value after tuition declined from around €1,010 to €600—both in real terms, adjusted to 2023 prices (DGES, 2024). This erosion of purchasing power undermines the program's ability to effectively reduce financial barriers, especially for the most economically vulnerable students.

3.4 The +Superior Program

Introduced in 2014, the +Superior Program aims to reduce regional imbalances by offering an additional grant to DGES recipients who relocate to low-demand or depopulated regions [3]for their studies. Eligibility is determined by both income and geographic criteria. Initially targeting a limited number of institutions, the program expanded in 2016 to include the Algarve, Madeira and the Azores (Diário da República, 2023).

While the +Superior Program aims to address regional disparities in higher education enrollment, comprehensive evaluations of its effectiveness are currently lacking.

4 Academic Performance of First-Year Students

This chapter investigates the impact of receiving the DGES grant on the academic performance of first-year students in HE in Portugal. The impact is evaluated through metrics such as dropout rates, completion of ECTS credits and graduation prospects.

4.1 Data and Sample Selection

The analysis of first-year academic outcomes is based on two administrative datasets. The first is provided by DGES, which includes all students who applied for the social support scholarship between the academic years 2013/14 and 2023/24 (Annex 8.1). The second dataset comes from the Higher Education Student Enrollment and Graduation Registry (RAIDES), maintained

[3]The regions initially covered by the program include Beja, Bragança, Castelo Branco, Guarda, Portalegre, Santarém, Tomar, Viana do Castelo, Viseu, Covilhã, Évora, Vila Real and Oliveira do Hospital.

by the Directorate-General for Statistics on Education and Science (DGEEC). RAIDES records enrollment and graduation records for all students in Portuguese HE institutions, enabling the analysis of key academic performance indicators that serve as outcome variables in this study (Annex 8.2). A unique student identifier is used to merge these two datasets, ensuring the ability to follow students over time.

This study focuses on first-year students enrolled in HE programs in Portugal, including bachelor's, master's and integrated master's degrees. The analysis is restricted to this group, as eligibility for the grant in subsequent years depends on academic performance, which could introduce endogeneity into the running variable. In the first year, however, eligibility is based solely on per capita household income, since no merit-based criteria apply at this stage.

The sample includes students who applied for the grant and whose income was close to the eligibility threshold—either just below or just above it. These students form the basis for our Regression Discontinuity Design (RDD), in which the treatment group consists of those with income just below the threshold who received the grant, while the control group includes those whose income was slightly above the threshold and therefore did not receive the grant. This creates a discontinuity in the probability of receiving the grant, as students near the threshold are comparable in all respects except for their eligibility status (Lee & Lemieux, 2010)

To ensure the internal validity of the design, the sample is restricted to students under the age of 50, enrolled full-time, not classified as orphans and not reporting a disability or employment status at the time of application.

Per capita income used for eligibility is normalized around the cutoff value for the scholarship for each academic year (Annex 8.4). By selecting students close to the income threshold and applying the exclusion criteria, we ensure that the assignment mechanism is quasi-random, allowing for the estimation of the Local Average Treatment Effect (LATE) of receiving the

grant. The total sample for all years considered comprises 240 868 students.

4.2 Descriptive Statistics

To assess the effect of the DGES grant, we consider a set of outcome variables (Annex 8.5) derived from student academic records available in the administrative dataset maintained by DGEEC. Specifically, we examine indicators of persistence in HE (e.g., dropout indicators), academic performance (e.g., number of ECTS completed, final grades), program continuity, and progression and completion metrics, such as reapplication for the grant and graduation outcomes. These outcomes capture critical dimensions of students' academic trajectories—both short- and long-term—that are theoretically and empirically relevant for evaluating the impact of financial aid interventions such as the DGES grant.

Table 1 displays the means of the variables of interest for the two groups of students in the sample whose income was close to the eligibility threshold. Differences in outcomes are observed between the treatment group and the control group. Overall, treated students show systematically better academic outcomes: they are significantly less likely to drop out, more likely to complete ECTS and graduate and they exhibit greater program stability.

Table 1: Descriptive Statistics: Outcome Variables

Variable	Control	Treated	Difference	SE
Never Found	0.0880	0.0193	-0.0687***	0.0009
Dropout	0.2630	0.1656	-0.0947***	0.0018
Dropout B	0.1723	0.1463	-0.0259***	0.0017
Same Program	0.9292	0.9551	0.027***	0,0011
Switched Program	0,0708	0,044	-0.027***	0,0012
Completed Enrolled ECTS	0.3709	0.4382	0.0633***	0,0023
Obtained 36 ECTS	0.5819	0.6905	0.1086***	0,0022
Applied Again	0,374	0,8269	0.453***	0,0021
Graduated	0.4988	0.5425	0.0437***	0,0023
Graduated On Time	0,3222	0,3571	0.035***	0,0022
Final Grade	14.2478	14.2130	-0.035***	0.0096

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 2 compares the characteristics of grant recipients with those of non-recipients. On average, grant recipients tend to be younger and predominantly female. There is also a higher

proportion of grant recipients enrolled in bachelor's degree programs and in public HE institutions.

Table 2: Descriptive Statistics: Control Variables

Variable	Control	Treated	Difference	SE
Age	19.9349	19.2407	-0.69418***	0.0159
Female	0.6054	0.6356	0.03010***	0.00226
Lisbon Metro Area	0.2010	0,1445	-0.05657***	0.00171
Alentejo	0,068	0.0627	-0.005***	0,0011
Algarve	0.0346	0.0272	-0.007***	0,0008
Centre	0.2203	0.2289	0.009***	0,002
North	0.4179	0,47135	0.053***	0.00233
Islands	0.0580	0.0651	0.0071***	0.00114
Public Institution	0.8119	0.8823	0.07***	0,0016
Bachelor's Degree	0.8266	0.8633	0.0367***	0,0017
Integrated Master's	0,1057	0,087	-0.019***	0,0014
Master's Degree	0.0676	0.0498	-0.018***	0,0011
Agriculture	0,0163	0,0138	-0.003***	0,0006
Arts	0,1211	0,1411	0.020***	0,0016
Business	0,1923	0,205	0.013***	0,00188
Natural Sciences	0,061	0,063	0.003**	0,0011
Social Sciences	0,1112	0,1176	0.006***	0,0015
Education	0,0281	0,0379	0.010***	0,0009
Engineering	0,1413	0.1369	-0.004***	0,00161
Health	0,155	0,1736	0.019***	0,0017
Services	0.0698	0.0746	0.005***	0.00122
ICT	0.0157	0.0160	0.000	0.00059

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The composition of the treatment and control groups varies across regions of residence, which may indicate regional disparities in access to or distribution of the grant. Regarding fields of study, the most common areas among students—regardless of grant receipt—are Arts, Agriculture, Business, Social Sciences, Engineering, and Health.

4.3 Methodology

The initial analysis examines the relationship between per capita income and grant receipt using two variables: the treatment variable (actual receipt of the grant) and the intention-to-treat variable (eligibility based on per capita income). The results indicate a fuzzy distribution around the threshold, with 82 students receiving the grant despite exceeding the income limit, and 26 937 students below the threshold who did not receive the grant.

This study adopts the methodology developed in the JRC Technical Report (Guthmuller & Meroni, 2022) to evaluate the impact of the social support scholarship in HE on students'

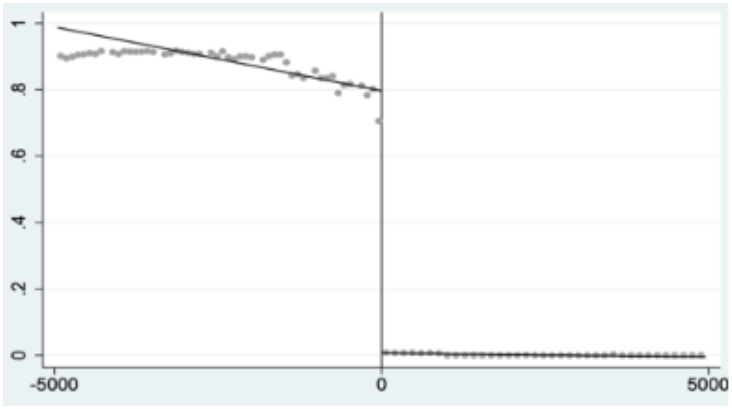

Figure 1: Probability of receiving the grant based on the running variable. The horizontal axis represents the running variable, while the vertical axis indicates the probability of receiving the DGES grant. The black line indicates the trend, while the dots represent the observed data.

academic outcomes. We employ a Fuzzy Regression Discontinuity Design (RDD) to estimate the causal effect of grant receipt on student academic performance.

Formally, let Y_i represent academic performance, which serves as the main outcome variable for student i. The variable X_i denotes the household's per capita income of the student and is used to determine eligibility for the grant. T_i identifies whether a student is eligible for the grant, while D_i indicates actual receipt of the grant. In this setup, $D_i \neq T_i$, reflecting imperfect compliance between eligibility and treatment receipt. Eligibility is defined by $T_i = 1(X_i < c)$, meaning students are eligible if their income falls below a predefined threshold c.

Within the potential outcomes framework, treatment status D_i is defined as $D_i = D_i(0)(1 - T_i) + D_i(1)T_i$, where $D_i(1)$ represents the treatment status when assigned to the treatment group ($T_i = 1$), and $D_i(0)$ corresponds to the control condition ($T_i = 0$).

The observed outcome is: $\mathbf{Y}_i = Y_i(0)(1 - D_i) + Y_i(1)D_i$, where $Y_i(1)$ and $Y_i(0)$ denote potential outcomes under treatment and control, respectively.

In a fuzzy regression discontinuity design (RDD), the average treatment effect at the cutoff is identified as follows (Hahn et al., 2001):

$$E[Y_i(1) - Y_i(0) \mid X_i = c] = \frac{\lim_{x \downarrow c} E[Y_i \mid X_i = x] - \lim_{x \uparrow c} E[Y_i \mid X_i = x]}{\lim_{x \downarrow c} E[D_i \mid X_i = x] - \lim_{x \uparrow c} E[D_i \mid X_i = x]} \quad (1)$$

In this context, the average treatment effect is estimated by examining the difference in academic outcomes between students on either side of the threshold, adjusted for the discontinuity in the probability of receiving the grant. We estimate the regression discontinuity design using a non-parametric approach [4]. Specifically, we employ local polynomial estimators that approximate the regression functions on either side of the threshold through weighted polynomial regressions. The weights are assigned using a kernel function based on each observation's distance from the cutoff. Implementing these estimators requires selecting an appropriate bandwidth. For this purpose, we adopt the optimal bandwidth selection procedure developed by Calonico et al. (2014, 2020), which is based on a mean squared error (MSE)-optimal selection method and uses a triangular kernel, as discussed in Cattaneo et al. (2019). In our baseline specification, we control for the academic year. We also examine the distribution of the running variable to identify any potential mass points, which are addressed following the approach of Calonico et al. (2014). To obtain valid inference, we compute bias-corrected confidence intervals using a robust variance estimator suitable for the MSE-optimal bandwidth. The model is estimated both without and with covariates, following the framework outlined by Calonico et al. (2019). While the inclusion of covariates does not alter the treatment effect estimates, it can enhance the precision of the results.

To identify the causal effect of the treatment on the outcome variables, we employed a two-stage least squares (2SLS) estimation strategy. Furthermore, the point estimator is based on a local linear regression, while a quadratic polynomial is used for bias correction.

[4]Non-parametric methods are preferred in regression discontinuity (RD) analysis because they reduce potential bias by focusing on observations closer to the threshold, offering a balance between flexibility and simplicity.

4.4 RDD Results

Table 3: RRD Estimation results: First-Year Students

	Dropout	Dropout B	Never Found	Obtained 36 ECTS
Treatment	-0.0169**	-0.0126**	-0.0111***	0.0177**
	(0.00658)	(0.00563)	(0.00339)	(0.00779)
Observations	87,500	97,400	82,950	105,104
	Completed Enrolled ECTS	Same Program	Switched Program	Applied for Scholarship Again
Treatment	0.0185**	0.0225***	-0.0225***	0.426***
	(0.00807)	(0.00689)	(0.00689)	(0.00954)
Observations	115,121	96,697	96,719	63,915
	Graduated	Graduated On Time	Final Grade	
Treatment	0.0299***	0.0181*	0.0394	
	(0.0104)	(0.00953)	(0.0288)	
Observations	67,195	81,190	96,298	

Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3 presents the estimated effects of grant receipt on students' academic performance.

The results indicate that, on average, receiving the grant has a statistically significant negative effect on the probability of dropping out, reducing it by approximately 1.3 to 1.7 percentage points (as shown in the Dropout and Dropout B columns). There is also evidence of a negative impact on the likelihood of a student not being found in the DGEEC dataset, with grant receipt reducing this probability by about 1.1 percentage points. This may reflect, ceteris paribus, improved administrative matching for grant recipients or suggest that students who do not receive the grant are less likely to enroll and may permanently disengage from higher education.

Regarding academic performance, receiving the grant increases the probability of completing at least 36 ECTS by 1.8 percentage points and the likelihood of completing all enrolled ECTS by 1.9 percentage points.

With respect to academic pathway choices, receiving the grant reduces the probability of changing degree programs by 2.3 percentage points, indicating a stabilizing effect on students' academic trajectories.

We also find that, on average, grant recipients are 42.6 percentage points more likely to

reapply for the grant in the following academic year.

In the long term, receiving the grant increases the likelihood of graduation by approximately 3 percentage points. The effect on on-time graduation is more modest—an increase of 1.8 percentage points—which is statistically significant at the 10% level. No statistically significant effect is found on final grades, suggesting that, ceteris paribus, scholarship receipt does not influence students' academic excellence as measured by GPA.

In summary, our analysis reveals that scholarship receipt has an immediate effect on reducing dropout rates, increasing the completion of required ECTS and improving graduation outcomes for first-year students.

4.5 Robustness Checks

To assess the robustness of our findings, we re-estimated the model with the inclusion of control variables, as shown in Table A3. These covariates include student characteristics such as age, gender, region of enrollment, type of degree (Bachelor's, Master's or Integrated Master's), field of study, and the nature of the institution (public or private). As Calonico et al. (2019) emphasize, the inclusion of predetermined covariates should not alter point estimates but can enhance estimation efficiency by reducing standard errors. Consistent with this expectation, our results remain stable in magnitude, while standard errors decrease, reinforcing the reliability of the estimated effects.

We also conducted a heterogeneity analysis by splitting the sample into Bachelor's and Integrated Master's students versus Master's students. The results, presented in Table A4, indicate that treatment effects are evident for both groups, with most outcomes showing slightly stronger effects among Master's students— particularly in completing 36 ECTS, graduating and reducing the probability of dropping out. Nonetheless, Bachelor's students display more pronounced effects in certain areas, such as the likelihood of not appearing in the DGEEC dataset ("Never

Found") and completing all enrolled ECTS. Additionally, a statistically significant positive impact on final grades is observed only among Bachelor's students.

In addition, we carried out several robustness tests to validate the assumptions of the fuzzy RDD. First, we examined the potential manipulation of the running variable—per capita income — by plotting its distribution around the eligibility threshold. No evidence of manipulation was detected. This is likely due to the complexity of calculating household income and the inexperience of first-time applicants — who may not have precise expectations about their eligibility — and the fact that income data are based on official tax declarations submitted to the national tax authority.

We further assessed covariate balance by estimating local linear regressions with student characteristics as dependent variables. The results, presented in Table A5, show that most covariates do not exhibit significant discontinuities at the eligibility threshold, supporting the assumption that treated and control groups are comparable in observable characteristics. Although small but statistically significant differences are observed in age and the likelihood of being enrolled in a bachelor's program, their magnitudes are limited and not considered practically significant.

To strengthen the credibility of the causal interpretation, we conducted placebo tests using alternative thresholds both below and above the actual cutoff. The results on Table A6 show no significant discontinuities at these placebo points, supporting the validity of the estimated treatment effect at the true threshold.

Finally, we tested the robustness of the findings under alternative polynomial specifications (quadratic and cubic). The results remained qualitatively unchanged across these functional forms, providing additional evidence of the stability and reliability of our estimates (Table A7).

5 Impact of the +Superior Program

This chapter evaluates the impact of the +Superior Program on student enrollment and academic performance in public HE institutions in Portugal. The program aims to promote territorial cohesion and facilitate access to HE for economically disadvantaged students by encouraging their mobility to institutions located in regions with lower demand and demographic pressure, through the provision of financial grants.

5.1 Data and Sample Selection

The data used in this analysis are the same as those employed in the previous chapter.

The sample is restricted to first-time students enrolled in Bachelor's or Integrated Master's degree programs, as these were the only cycles initially covered by the program. We exclude students over 50 years of age, part-time students, students with disabilities, working students, orphans and all students enrolled in private institutions. Academic years after 2019/20 are also excluded to avoid potential interference from the COVID-19 pandemic.

The treatment group comprises public institutions covered by the program, while the control group consists of public polytechnic institutions not included in the program. The composition of the treated group is as detailed below:

Institutions treated from 2014 onward: Polytechnic Institute of Beja; Polytechnic Institute of Bragança; Polytechnic Institute of Castelo Branco; Polytechnic Institute of Guarda; Polytechnic Institute of Portalegre; Polytechnic Institute of Santarém; Polytechnic Institute of Tomar; Polytechnic Institute of Viana do Castelo; Polytechnic Institute of Viseu; University of Beira Interior; University of Évora; University of Trás-os-Montes and Alto Douro; School of Technology and Management of Oliveira do Hospital of the Polytechnic Institute of Coimbra.

Institutions treated from 2016 onward: University of the Azores; University of the Al-

garve; University of Madeira.

Based on this sample, a panel dataset was constructed comprising 175 observations, covering 25 institutions over 7 academic years, from 2013/14 to 2019/20.

5.2 Descriptive Statistics

To assess the effect of the +Superior Program, we consider a set of outcome variables (Annex 8.8) aggregated at the institution-year level, distinguishing between institutions included in the program and those that are not. These include total student enrollment, the proportion of displaced students, average entry grades (for the full sample and for displaced students), and the share of students whose parents—both mothers and fathers—have completed HE, also measured separately for the overall student sample and for displaced students. The first two indicators—enrollment and the proportion of displaced students—serve to evaluate whether the program met its primary objective of expanding access and promoting territorial cohesion. The remaining variables capture potential shifts in the academic and socioeconomic composition of the student body, offering insight into whether the program may have influenced the profile of students enrolling in low-demand regions.

Table 4 presents the average values of these variables for both treated and control groups. Institutions covered by the +Superior Program tend to have fewer enrolled students, lower entry grades and a less advantaged socioeconomic composition. They also display a higher proportion of displaced students.

Table 4: Descriptive Statistics: Outcome Variables

Variable	Control	Treated	Difference	SE
Enrolled	6253.38	4460.06	-1793.33***	596.57
Entry Grade	137.48	129.65	-7.82***	1.08
Entry Grade (displaced students)	138.80	129.47	-9.33***	1.14
% Parents with HE	14.33	11.04	-3.29***	1.02
% Parents with HE (displaced students)	13.25	11.31	-1.95	1.26
% Mothers with HE	19.99	17.55	-2.44*	1.27
% Mothers with HE (displaced students)	20.39	16.35	-4.04**	1.67
% Displaced Students	22.57	34.85	12.28***	4.04

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

5.3 Methodology

To identify the causal effect of the +Superior Program, we employ a Difference-in-Differences (DiD) approach, comparing the evolution of student enrollment and composition before and after the implementation of the program between treated and untreated institutions. The estimated effect corresponds to the Average Treatment Effect on the Treated (ATT), which captures the impact of the program on the institutions covered by the policy.

Given the staggered implementation of the +Superior Program, we adopt the methodological framework proposed by Callaway and Sant'Anna (2021), which allows for treatment at different points in time across units.

Formally, the baseline model can be represented as follows:

$$Y_{it} = \alpha_i + \lambda_t + \theta_{g,t} \cdot D_{it}^{g} + \varepsilon_{it} \tag{2}$$

Where Y_{it} is the outcome variable of institution i in school year t; α_i are institution fixed effects; λ_t are year fixed effects; D_{it}^{g} is an indicator that takes the value 1 if unit i was treated in year g and $t \geq g$; $\theta_{g,t}$ is the group-time specific treatment effect for those treated in year g, evaluated in period t; ε_{it} is the error term.

To isolate the effect of the program, we control for both institution and time fixed effects. To allow for variation in treatment timing and dynamic effects, the model estimates cohort-

specific treatment effects rather than assuming a constant average effect across groups. At each period, only institutions that have not yet been treated are used as controls, preserving credible comparisons and avoiding contamination from future treated units. Standard errors are clustered at the institution level to correct for serial correlation within institutions over time, which could otherwise bias inference. The data is structured as a panel, allowing us to follow institutions across multiple academic years.

Despite the robustness of the methodology, the validity of the model depends on the parallel trends assumption, which states that, in the absence of treatment, the evolution of the outcome variables would have been similar across groups. In our case, it is possible to verify the plausibility of the parallel trends assumption for the institutions treated in 2016, as multiple pre-treatment years are available. However, for the institutions treated in 2014, such verification is not possible given that only one pre-treatment year is observed, which requires caution in interpreting the results.

5.4 DiD Results

The results presented in Table 5 indicate that the +Superior Program did not have a statistically significant impact on either the total number of enrollments or the percentage of displaced students. For both variables, the confidence intervals for the estimated differences include zero for all post-treatment periods, from 0 to 5.

Moreover, the parallel trends assumption appears not to be fully satisfied, as the confidence intervals for the pre-treatment periods –3 and –2 exclude zero. This is particularly true for institutions treated in 2016, whereas for those treated in 2014, the limited number of pre-treatment years makes it impossible to empirically verify this condition. Therefore, the findings should be interpreted with caution.

Given that the program's core objective does not appear to have been achieved, we also

Table
5: Effects of the +Superior Program: Estimates for Enrollments and % Displaced Students (Event Study)

	Enrollments			% Displaced Students		
Year Post-Treatment	Coef.	Std. Error	95% CI	Coef.	Std. Error	95% CI
-3	404.17	120.96	[167.10 , 641.24]	-10.18	5.67	[-21.30 , 0.94]
-2	250.03	116.89	[20.93 , 479.14]	-10.49	4.62	[-19.55 , -1.43]
0	-45.64	60.01	[-163.26 , 71.97]	2.39	2.34	[-2.20 , 6.97]
1	-18.21	113.13	[-239.94 , 203.52]	1.43	4.54	[-7.47 , 10.32]
2	-138.43	180.16	[-491.55 , 214.68]	-1.63	3.48	[-8.45 , 5.19]
3	-182.47	232.22	[-637.61 , 272.66]	-2.63	6.34	[-15.06 , 9.79]
4	-53.13	325.66	[-691.42 , 585.15]	-7.60	5.79	[-18.95 , 3.74]
5	182.92	337.71	[-478.98 , 844.81]	-11.19	7.56	[-26.01 , 3.63]

assessed its impact on the composition of the enrolled students. The results are presented in Table 6.

Regarding entry grades, a decrease is observed following the implementation of the program. However, this should not be interpreted as causal, since pre-trends already pointed to a downward trajectory for the institutions treated in 2016. Thus, the estimated effects likely reflect a pre-existing trend.

In contrast, for the entry grades of displaced students, the results show a statistically significant negative effect after the program's implementation. The parallel trends assumption appears plausible for the institutions treated in 2016, allowing these results to be interpreted as evidence of an adverse impact of the program. This effect may be associated with a potential stigma attributed to institutions covered by the +Superior Program.

As for the variables capturing the students' socioeconomic background—specifically, the percentage of fathers and mothers with HE, with a particular focus on displaced students—the estimated effects are mostly statistically insignificant. However, an exception is observed in the post-treatment period 4, in the case of displaced students, where a statistically significant negative effect emerges. This result may indicate a slight medium-term shift in the socioeconomic composition of the student group, potentially reflecting changes in access profiles induced by the +Superior Program.

The detailed results are presented in Annex 8.10. It is worth noting that the inclusion of

Table 6: Effects of the +Superior Program (Event Study)

	Entry Grades			Entry Grades (Displaced)			% Fathers HE		
Year Post-Treatment	Coef.	SE	CI	Coef.	SE	CI	Coef.	SE	CI
-3	2.76	1.26	[0.3 , 5.21]	2.28	4.26	[-6.07 10.63]	4.53	2.80	[-0.96 10.01]
-2	0.13	0.91	[-1.66 , 1.91]	0.33	1.49	[-2.61 , 3.26]	1.18	1.80	[-2.34 , 4.70]
0	-1.07	0.80	[-2.64 , 0.50]	-1.78	1.32	[-4.36 , 0.81]	-1.34	1.54	[-4.36 , 1.66]
1	-2.52	0.90	[-4.27 , -0.76]	-4.09	1.54	[-7.11 , -1.07]	-1.99	1.91	[-5.73 , 1.75]
2	-2.66	0.93	[-4.47 , -0.83]	-3.26	1.49	[-6.17 , -0.35]	-0.47	2.28	[-4.99 , 4.00]
3	-3.61	1.31	[-6.17 , -1.04]	-5.27	2.04	[-9.27 , -1.26]	0.33	2.46	[-4.48 , 5.14]
4	-4.56	1.27	[-7.05 , -2.07]	-6.65	1.80	[-10.18 , -3.11]	-3.32	2.74	[-8.70 , 2.05]
5	-4.30	1.57	[-7.38 , -1.22]	-5.75	2.43	[-10.52 , -0.99]	-1.86	4.18	[-10.06 , 6.33]
	% Fathers HE (Displaced)			% Mothers HE			% Mothers HE (Displaced)		
Year Post-Treatment	Coef.	SE	CI	Coef.	SE	CI	Coef.	SE	CI
-3	6.37	4.77	[-2.98 , 15.72]	4.80	4.12	[-3.27 , 12.87]	2.01	5.97	[-9.69 , 13.71]
-2	2.63	1.87	[-1.05 , 6.30]	1.59	4.35	[-6.94 , 10.12]	0.72	4.65	[-8.39 , 9.83]
0	-2.33	2.59	[-7.40 , 2.74]	-1.90	1.58	[-5.01 , 1.20]	-1.61	2.46	[-6.43 , 3.20]
1	-4.06	2.15	[-8.20 , 0.16]	-2.67	2.34	[-7.25 , 1.91]	-2.88	2.82	[-8.40 , 2.64]
2	-0.58	2.73	[-5.92 , 4.76]	0.60	2.59	[-4.48 , 5.67]	1.25	2.91	[-4.44 , 6.94]
3	1.06	2.84	[-4.51 , 6.63]	-0.74	2.77	[-6.18 , 4.69]	1.15	4.24	[-7.15 , 9.46]
4	-6.31	2.71	[-11.63 , -0.996]	-4.19	3.30	[-10.65 , 2.27]	-10.85	4.12	[-18.92 , -2.78]
5	-2.28	4.34	[-10.78 , 6.23]	-3.71	4.61	[-12.75 , 5.33]	-4.98	5.39	[-15.53 , 5.58]

control variables in the model does not alter the findings, reinforcing the robustness of the conclusions. Furthermore, the results remain consistent even when the control group is expanded to include all public institutions, both universities and polytechnic institutions.

For outcomes where the parallel trends assumption may not hold, we implement a sensitivity analysis grounded in the smoothness restriction framework developed by Rambachan and Roth (2023). This method constructs conservative bounds for the treatment effect by relaxing the assumption of strict parallel trends and allowing for deviations that evolve gradually across time, subject to formal smoothness constraints. Specifically, it limits how much the slope of the treatment effect path can change across periods, formalized through a smoothness parameter M. When M=0, the counterfactual trend is assumed to be linear; higher values of M permit greater flexibility and mild non-linearity.

The procedure uses a pre-treatment window to estimate residual variance and trend stability, then scales allowable deviations accordingly. By varying M, the method produces conservative confidence intervals that remain valid even under moderate violations of the identifying assumption. These intervals maintain at least 95% coverage of the true effect and account for estimation

error in both the treatment and pre-treatment trend estimates, offering a robust assessment of causal inference.

Table 7 presents the estimated effects of the +Superior Program. Results indicate a statistically significant increase in overall student enrollment, with conservative confidence intervals excluding zero. In contrast, no significant impact is detected on the percentage of displaced students, even under conservative specifications. Regarding entry grades, the application of the robust method confirms that the observed decline following the implementation of the program cannot be interpreted as a causal effect of the policy. The resulting confidence intervals consistently include zero, suggesting that the estimated effects reflect a pre-existing downward trend rather than a consequence of the intervention.

Table 7: Robust Confidence Intervals for the Estimated Effects of the +Superior Program

Enrollment			Entry Grades			% Displaced Students		
Year	Lower CI	Upper CI	Year	Lower CI	Upper CI	Year	Lower CI	Upper CI
0	-23.404	360.132	0	-0.228	2.828	0	-2.609	9.875
1	127.409	713.181	1	-1.437	3.514	1	-15.247	9.538
2	103.748	937.107	2	-1.224	6.110	2	-17.129	10.082
3	157.730	1241.478	3	-2.079	8.190	3	-32.233	7.743
4	345.641	1706.256	4	-2.401	9.848	4	-35.725	10.719
5	679.702	2258.151	5	-1.381	13.415	5	-41.772	11.110

It is important to emphasize that this method is appropriate only in cases where a clear trend is observable in the pre-treatment periods. Moreover, the analysis was based solely on the three institutions included in the second phase of the program. Therefore, any inferences should be interpreted with caution.

In summary, the +Superior Program had a statistically significant positive effect on enrollment in treated institutions, indicating improved access to HE in low-demand regions. However, no robust evidence was found regarding its impact on the proportion of displaced students. Additionally, the program appears to have coincided with a decline in the academic and socioeconomic profile of displaced students, reflected in lower entry grades and a reduced proportion of those with highly educated parents. Although these findings are limited, they raise the possi-

bility of a stigma effect associated with the institutions covered by the program. Nevertheless, such conclusions should be interpreted with caution.

6 Conclusion

This paper has undertaken a empirical evaluation of two central financial aid policies within Portugal's HE system: the DGES grant and the +Superior Program. By applying quasi-experimental methodologies—namely a Fuzzy Regression Discontinuity Design (RDD) and a staggered Difference-in-Differences (DiD) framework—the analysis generates credible causal evidence on the effectiveness of these instruments in enhancing academic performance and addressing territorial disparities.

The first part of the analysis focused on the DGES grant and its effects on first-year students, whose eligibility is determined exclusively by per capita household income. The results indicate that the grant has a statistically significant on several academic outcomes. Recipients are between 1.3 and 1.7 percentage points less likely to drop out, 1.9 percentage points more likely to complete all enrolled ECTS and 1.8 percentage points more likely to meet the 36-ECTS threshold required for renewal. Additionally, they exhibit a 3 percentage point increase in the likelihood of graduating and are 42.6 percentage points more likely to reapply for the scholarship in the subsequent academic year. In contrast, no significant effect is observed on final grades, indicating that it may not directly affect academic excellence as measured by GPA. These effects are especially pronounced among master's degree students.

Robustness checks confirmed the validity of the findings, showing no evidence of manipulation around the income eligibility threshold and consistent treatment effects across alternative specifications. Despite its strengths, the RDD method has clear limitations. It provides highly credible estimates, but these apply only to students near the income threshold and cannot cap-

ture the grant's effects on students from significantly poorer backgrounds.

The second part of this report evaluated the +Superior Program. The program seeks to encourage mobility through the provision of financial grants for students that study in institutions located in regions with lower demand and demographic pressure. Contrary to initial policy expectations, the findings show no statistically significant effect on the percentage of displaced students. Although the number of enrollments in these institutions did increase—particularly when using conservative and robust estimation methods—there is some evidence of a decline in the average entry grades of displaced students. Additionally, a reduction in the proportion of displaced students whose parents held HE degrees was observed, which may reflect a slight decline in the academic and socioeconomic composition of the student body. These findings suggest the emergence of unintended consequences, including the possibility of a stigma effect.

The divergent outcomes of these two policies carry meaningful policy implications. The DGES grant illustrates the potential of well-targeted, needs-based aid to enhance equity and academic continuity. By contrast, the limited reach of the +Superior Program underscores the importance of coupling financial support with broader strategies that improve the attractiveness and academic quality of peripheral institutions.

Future research should extend the current analysis in several directions. First, for the +Superior Program, incorporating additional pre-treatment years would allow for more robust validation of the parallel trends assumption underpinning the DiD identification strategy. Second, it is essential to assess whether the COVID-19 pandemic altered the impact of either program. Third, future work should explore longer-term outcomes, such as labor market performance and intergenerational mobility.

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8 Annexes

8.1 Academic Performance of First-Year Students: DGES Data

The dataset provided by DGES offers comprehensive information on grant applicants, including:

- Candidate characteristics (age, gender, household composition)
- Type of institution selected (public or private)
- Degree type (bachelor's, master's, or integrated master's program)
- Field of study
- Region of enrollment
- Current academic and curricular year
- Per capita income
- Application outcome (approved or rejected)
- Reasons for rejection

8.2 Academic Performance of First-Year Students: DGEEC Data

The dataset provided by DGEEC offers comprehensive information on grant applicants, including:

- Dropout Outcomes
- ECTS Completion
- Graduation Outcomes

- Program Continuity
- Grant Reapplication

8.3 Academic Performance of First-Year Students: Conditions for DGES Grant Eligibility

A student is considered eligible for a study grant if they meet the following conditions:

1. They satisfy one of the following nationality requirements:
   (a) Are a Portuguese national;
   (b) Are a national of a Member State of the European Union;
   (c) Are stateless or hold political refugee status;
   (d) Are a foreign national from a country with which Portugal has established cooperation agreements.
2. They are enrolled in a Portuguese higher education institution and registered in a program—such as a short-cycle higher technical program (TeSP), a bachelor's degree, an integrated master's, or a master's degree.
3. They do not hold a qualification equivalent to or higher than the one in which they are currently enrolled.
4. They are enrolled in a minimum of 30 ECTS, except if they are finishing the degree, writing the thesis, or completing the internship.
5. If they were enrolled in higher education in the previous academic year, they must have passed at least 36 ECTS (if registered in 36 or more) or all registered credits (if fewer than 36).

6. They must be able to complete the program within a maximum of $n + 1$ years if the standard duration (n) is three years or fewer, or within $n + 2$ years if the duration exceeds three years.

7. Their per capita household income must be equal to or less than 23 times the value of the Social Support Index (IAS) in effect at the start of the academic year, plus the maximum tuition fee set that year for first-cycle programs in public higher education.

8. The total value of their household's financial assets, as of December 31 of the year prior to the academic year, must not exceed 240 times the value of the IAS.

9. They must have a regularized tax and social security status.

8.4 Academic Performance of First-Year Students: Maximum Reference Values for Per Capita Income

Table A1: Reference Value, IAS Value, and Tuition Fee by Academic Year

Academic Year	Reference Value	IAS Value	Tuition Fee
2011–2012	€6,868.79	€5,869.08 (14)	€999.71
2012–2013	€6,906.28	€5,869.08 (14)	€1,037.20
2013–2014	€6,934.80	€5,869.08 (14)	€1,065.72
2014–2015	€6,936.93	€5,869.08 (14)	€1,067.85
2015–2016	€7,770.99	€6,707.52 (16)	€1,063.47
2016–2017	€7,770.99	€6,707.52 (16)	€1,063.47
2017–2018	€7,804.59	€6,741.12 (16)	€1,063.47
2018–2019	€7,925.87	€6,862.40 (16)	€1,063.47[1]
2019–2020	€8,035.63	€6,972.16 (16)	€1,063.47
2020–2021	€8,962.05	€7,898.58 (18)	€1,063.47
2021–2022	€8,962.05	€7,898.58 (18)	€1,063.47
2022–2023	€9,484.27	€8,420.80 (19)	€1,063.47
2023–2024	€11,049.89[2]	€11,049.89 (23)	€697[3]

[1] Tuition fees were frozen between the academic years 2018–2019 and 2022–2023 solely for the purpose of calculating eligibility for scholarships.

[2] This amount is different for students with working student status. For them, the reference amount is €12,569.89.

[3] Starting in the 2023–2024 academic year, the tuition fee amount is no longer taken into account.

8.5 Academic Performance of First-Year Students: Outcome Variables

1. **Never Found**: A binary variable equal to 1 when a student cannot be found at any point in the DGEEC dataset. This may occur either because the student applied for the grant but never enrolled in higher education or due to data-matching errors between the DGEEC and DGES datasets.

2. **Dropout**: A binary indicator set to 1 if the student is not present in the academic records after the first year, signaling withdrawal from higher education.

3. **Dropout (Version B)**: A binary variable equal to 1 if the student is missing from the

DGEEC academic records after application, excluding those who were never found in the system at all.

4. **Enrolled in the Same Program**: A binary variable set to 1 if the student is enrolled in exactly the same study program they declared when applying for the scholarship.

5. **Enrolled in a Different Program**: A binary indicator equal to 1 if the student enrolled in a different program than the one initially indicated in the scholarship application.

6. **Completed All Enrolled Credits**: A binary variable equal to 1 if the student successfully completed all ECTS credits in which they were enrolled at the end of the first academic year.

7. **Completed at Least 36 ECTS Credits**: A binary variable equal to 1 if the student successfully completed at least 36 ECTS credits at the end of the first year. For students enrolled in fewer than 36 ECTS, the variable is set to 1 if they completed all of their enrolled credits.[5]

8. **Applied Again**: A binary indicator equal to 1 if the student submitted a new application for the scholarship in the following academic year.

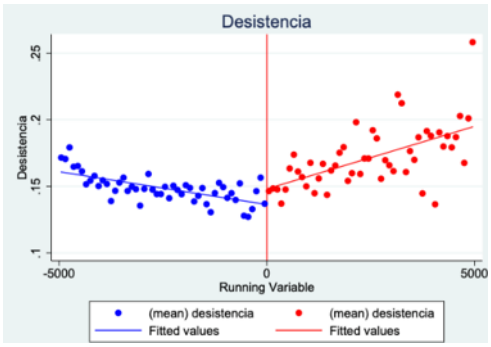
9. **Graduated**: A binary variable equal to 1 if the student completed a degree program at the same ISCED level as the one indicated in their initial scholarship application.

10. **Graduated On Time**: A binary variable equal to 1 if the student graduated within the regular duration of the program—two years for a master's degree, three years for a bachelor's degree, four years for a bachelor's in health sciences, and five years for an integrated master's program.

[5]Thirty-six ECTS credits correspond to the minimum academic progress required for students to remain eligible for the grant in the following academic year.

11. **Final Grade**: A continuous variable capturing the final grade attained by the student, available only for those who completed the same program originally specified in the scholarship application.

8.6 Academic Performance of First-Year Students: RDD Approach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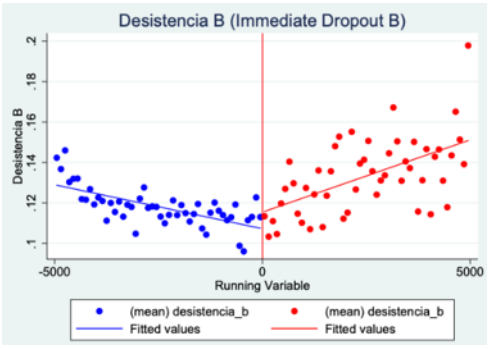
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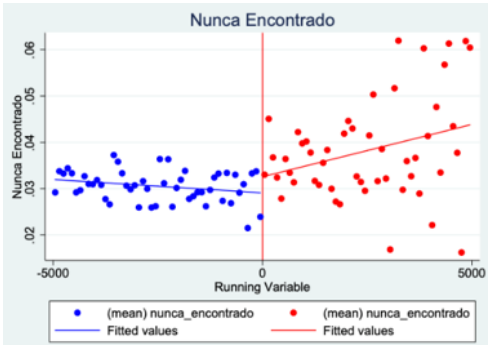
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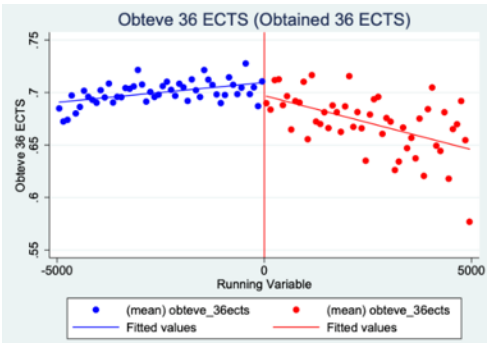
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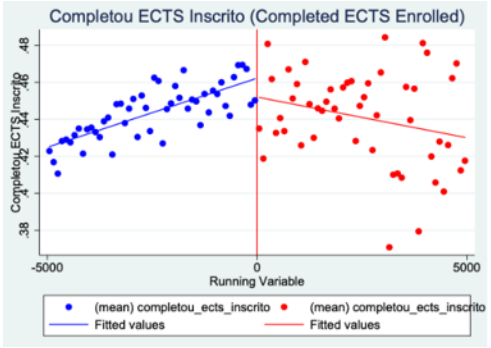
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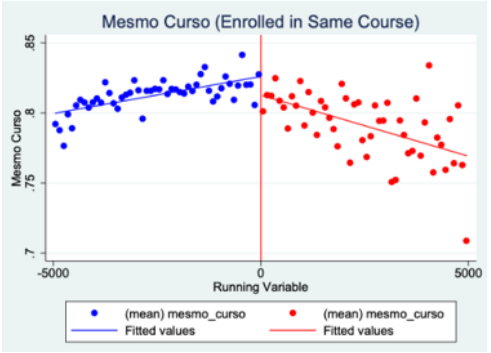
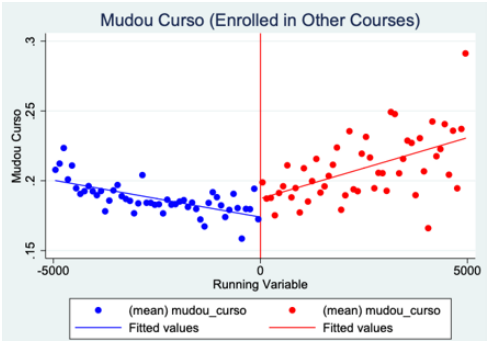
Running Variable
(mean) completou_ects_inscrito
Fitted values
(mean) completou_ects_inscrito
Fitted values


Mesmo Curso (Enrolled in Same Course)
Mesmo Curso
.7
.75
.8
.85
-5000
0
5000
Running Variable
(mean) mesmo_curso
Fitted values
(mean) mesmo_curso
Fitted values


Mudou Curso (Enrolled in Other Courses)
Mudou Curso
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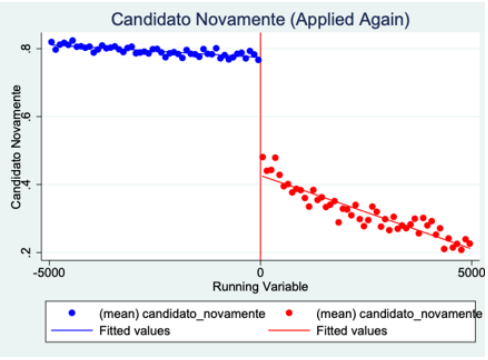
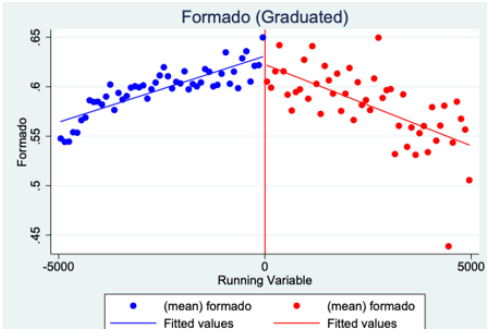
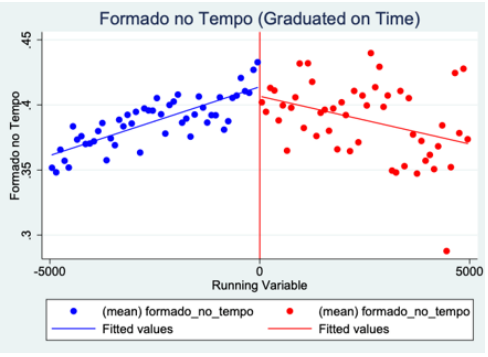
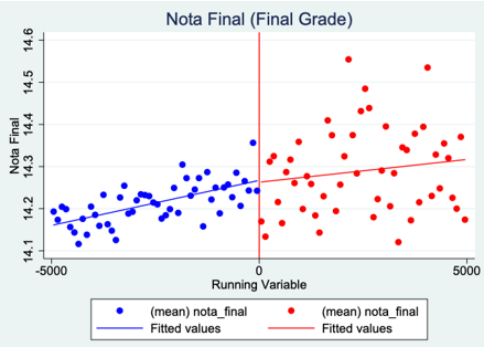
.2
.25
.3
-5000
0
5000
Running Variable
(mean) mudou_curso
Fitted values
(mean) mudou_curso
Fitted values


Candidato Novamente (Applied Again)
Candidato Novamente
.2
.4
.6
.8
-5000
0
5000
Running Variable
(mean) candidato_novamente
Fitted values
(mean) candidato_novamente
Fitted values


Formado (Graduated)
Formado
.45
.5
.55
.6
.65
-5000
0
5000
Running Variable
(mean) formado
Fitted values
(mean) formado
Fitted values


Formado no Tempo (Graduated on Time)
Formado no Tempo
.3
.35
.4
.45
-5000
0
5000
Running Variable
(mean) formado_no_tempo
Fitted values
(mean) formado_no_tempo
Fitted values


Nota Final (Final Grade)
Nota Final
14.1
14.2
14.3
14.4
14.5
14.6
-5000
0
5000
Running Variable
(mean) nota_final
Fitted values
(mean) nota_final
Fitted values

8.7 Academic Performance of First-Year Students: Robustness Checks

Table A2: RRD Estimation Results without controls

	Dropout	Immediate Dropout B	Never Found	Obtained 36 ECTS
First Stage	0.751***	0.757***	0.749***	0.761***
Second Stage	-0.0169**	-0.0126**	-0.0111***	0.0177**
	(0.0058)	(0.00563)	(0.0039)	(0.00779)
Observations	87,500	97,400	82,950	105,104
	Completed Enrolled ECTS	Same Course	Changed Course	Reapplied for Grant
First Stage	0.766***	0.756***	0.756***	0.737***
Second Stage	0.0185**	0.0225***	-0.0225***	0.426***
	(0.00807)	(0.00689)	(0.00689)	(0.00954)
Observations	115,121	96,697	96,719	63,915
	Graduated	Graduated On Time	Final Grade	
First Stage	0.738***	0.747***	0.756***	
Second Stage	0.0299***	0.0184*	0.0394	
	(0.0104)	(0.00953)	(0.0288)	
Observations	67,195	81,190	96,298	

Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A3: RDD Estimation Results with Controls

	Dropout	Dropout B	Never Found	Obtained 36 ECTS
First Stage	0.750***	0.749***	0.747***	0.760***
Second Stage	-0.0152**	-0.0138**	-0.000724***	0.0179**
	(0.00581)	(0.00587)	(0.000277)	(0.00745)
Observations	87,500	85,753	82,950	105,104
	Completed Enrolled ECTS	Same Program	Switched Program	Applied Again
First Stage	0.765***	0.755***	0.755***	0.735***
Second Stage	0.0192**	0.0202***	-0.0202***	0.427***
	(0.00778)	(0.00630)	(0.00630)	(0.00948)
Observations	115,121	96,697	96,719	63,915
	Graduated	Graduated On Time	Final Grade	
First Stage	0.736***	0.745***	0.755***	
Second Stage	0.0272***	0.0107	0.0457*	
	(0.0102)	(0.00898)	(0.0275)	
Observations	67,195	81,190	96,298	

Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A4: Heterogeneity Analysis (Bachelor's vs. Master's)

	Dropout		Dropout B		Never Found	
	Bachelor's	Master's	Bachelor's	Master's	Bachelor's	Master's
Treatment	-0.0170**	-0.0193***	-0.00908	-0.0124**	-0.0109***	-0.00854***
	(0.00647)	(0.00568)	(0.00577)	(0.00499)	(0.00342)	(0.00262)
Observations	90,580	117,022	92,421	123,078	81,530	135,941
	Obtained 36 ECTS		Completed ECTS		Same Program	
	Bachelor's	Master's	Bachelor's	Master's	Bachelor's	Master's
Treatment	0.0186**	0.0252***	0.0227***	0.0220***	0.00478	0.00414
	(0.00783)	(0.00659)	(0.00752)	(0.00768)	(0.00347)	(0.00356)
Observations	104,118	144,936	131,621	126,501	107,915	101,783
	Switched Program		Applied Again		Graduated	
	Bachelor's	Master's	Bachelor's	Master's	Bachelor's	Master's
Treatment	-0.00478	-0.00414	0.429***	0.442***	0.0287***	0.0337***
	(0.00347)	(0.00356)	(0.00941)	(0.00794)	(0.0103)	(0.00695)
Observations	107,915	101,783	57,065	80,958	68,601	146,636
	Graduated On Time		Final Grade			
	Bachelor's	Master's	Bachelor's	Master's		
Treatment	0.0182*	0.0231***	0.0492*	0.0319		
	(0.00938)	(0.00752)	(0.0295)	(0.0270)		
Observations	83,595	127,533	55,389	67,678		

Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A5: Covariate Balance Check

	Age	Female	Lisbon	Alentejo	Algarve
RD Estimate	-0.206***	0.0116	-0.000533	-0.00359	-0.00137
	(0.0543)	(0.00725)	(0.00548)	(0.00352)	(0.00254)
	Centre	North	Islands	Public Institution	Bachelor's Degree
RD Estimate	0.000381	-0.000370	0.00601	-2.09e-05	0.0165**
	(0.00654)	(0.00771)	(0.00383)	(0.00490)	(0.00653)
	Master's	Integrated Master's	Agriculture	Arts	
RD Estimate	0.00240	0.00240	0.000166	-0.00547	
	(0.00453)	(0.00453)	(0.00163)	(0.00455)	
	Business	Natural Sciences	Social Sciences	Education	
RD Estimate	-0.00357	-0.00242	0.00139	-0.00202	
	(0.00539)	(0.00362)	(0.00442)	(0.00238)	
	Engineering	Health	Services	ICT	
RD Estimate	-0.000915	0.00874*	-0.00384	0.00163	
	(0.00491)	(0.00510)	(0.00342)	(0.00175)	
Observations	240,868	240,868	240,868	240,868	240,868

Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

TableA6: Placebo Test for *Cutoff*

	-4000	**-3000**	**-2000**	**-1000**	**1000**	**2000**	**3000**	**4000**
Dropout	-0.000499	-0.00360*	0.000252	-0.00209	-0.00125	0.00172	0.003146	0.00423
	(0.00236)	(0.00219)	(0.00211)	(0.00238)	(0.00353)	(0.00428)	(0.00526)	(0.00596)
Dropout B	0.00305	0.0108**	0.000760	-0.00388	0.000780	0.00291	-0.00267	-0.00711
	(0.00504)	(0.00429)	(0.00426)	(0.00421)	(0.00663)	(0.00806)	(0.00978)	(0.0124)
Never Found	0.00195	0.00696	0.000903	-0.00480	-0.00231	0.00502	-0.00932e-05	-0.00504
	(0.00576)	(0.00466)	(0.00456)	(0.00522)	(0.00771)	(0.00902)	(0.0111)	(0.0135)
Obtained 36 ECTS	0.00289	-0.0106**	-0.000605	0.00524	-0.0115	0.0109	-0.0130	0.0192
	(0.00721)	(0.00570)	(0.00573)	(0.00611)	(0.00853)	(0.0114)	(0.0129)	(0.0168)
Completed ECTS	-0.00202	-6.34e-05	0.00480	0.00475	-0.00368	0.0105	-0.0144	-0.00766
	(0.00691)	(0.00621)	(0.00613)	(0.00649)	(0.00876)	(0.0117)	(0.0128)	(0.0154)
Same Program	0.00128	0.00118	0.00115	-0.00149	-0.00207	0.00476	-0.00157	-0.00399
	(0.00287)	(0.00255)	(0.00260)	(0.00281)	(0.00401)	(0.00468)	(0.00534)	(0.00678)
Switched Program	-0.00182	-0.00118	-0.00115	0.00149	0.00207	-0.00476	0.00157	0.00399
	(0.00287)	(0.00255)	(0.00260)	(0.00281)	(0.00401)	(0.00468)	(0.00534)	(0.00678)
Applied Again	-0.00669	-0.00911	-0.000779	-0.0202**	-0.0113	0.0595***	-0.00317	-0.00182
	(0.00643)	(0.00570)	(0.00940)	(0.00908)	(0.0179)	(0.0132)	(0.0176)	(0.0146)
Graduated	-0.00760	-0.00212	-0.00351	0.0105	-0.00177	0.0108	0.0293**	-0.0155
	(0.00878)	(0.00705)	(0.00738)	(0.00774)	(0.00949)	(0.0125)	(0.0131)	(0.0142)
Graduated on Time	-0.00245	0.000289	-0.00505	0.00527	-0.00941	0.0108	-0.0232*	-0.0201
	(0.00809)	(0.00667)	(0.00702)	(0.00750)	(0.00867)	(0.0115)	(0.0121)	(0.0133)
Final Grade	0.0162	0.0131	0.0210	-0.0162	-0.0306	0.126***	-0.0570	-0.00756
	(0.0230)	(0.0222)	(0.0214)	(0.0234)	(0.0351)	(0.0447)	(0.0450)	(0.0543)

Robust standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

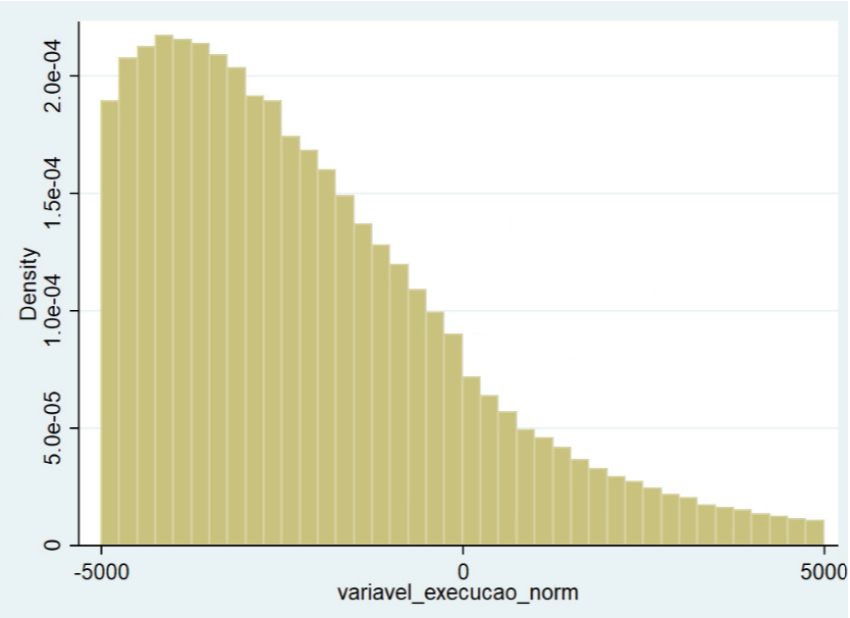


Figure A1: Manipulation of the running variable.

Table A7: Test for Polynomial Specifications

	Dropout		Dropout B		Never Found	
	Spec 2	Spec 3	Spec 2	Spec 3	Spec 2	Spec 3
RD Estimate	-0.0126**	-0.0128**	-0.00419	-0.00216	-0.0160	-0.0137
	(0.00630)	(0.00631)	(0.0119)	(0.0121)	(0.0105)	(0.0107)
Observations	82,950	82,950	87,500	87,500	97,400	97,400
	Obtained 36 ECTS		Completed ECTS		Same Program	
	Spec 2	Spec 3	Spec 2	Spec 3	Spec 2	Spec 3
RD Estimate	0.0125	0.0158	0.0247**	0.0281**	0.0208**	0.0231***
	(0.0149)	(0.0150)	(0.00752)	(0.00823)	(0.00843)	(0.00356)
Observations	104,118	144,936	131,621	126,501	107,915	101,783
	Switched Program		Applied Again		Graduated	
	Spec 2	Spec 3	Spec 2	Spec 3	Spec 2	Spec 3
RD Estimate	-0.0208**	-0.0231***	0.281***	0.279***	0.0834***	0.0853***
	(0.00823)	(0.00843)	(0.0234)	(0.0250)	(0.0242)	(0.0245)
Observations	107,915	101,783	55,386	55,386	67,195	67,195
	Graduated On Time		Final Grade			
	Spec 2	Spec 3	Spec 2	Spec 3		
RD Estimate	0.0339**	0.0348**	0.136*	0.154*		
	(0.0170)	(0.0174)	(0.0640)	(0.0659)		
Observations	81,190	81,190	58,561	58,561		

Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

8.8 Impact of the +Superior Program: Outcome Variables

1. **Number of Enrolled Students**: Total number of enrolled students per institution and academic year.

2. **Entry Grade (Mean)**: Average entry grade of students per institution and academic year.

3. **Entry Grade for Displaced Students (Mean)**: Average entry grade of displaced students per institution and academic year.

4. **Percentage of Fathers with Higher Education**: Proportion of students whose father has completed a higher education degree.

5. **Percentage of Fathers with Higher Education (Displaced Students)**: Proportion of displaced students whose father has completed a higher education degree.

6. **Percentage of Mothers with Higher Education**: Proportion of students whose mother has completed a higher education degree.

7. **Percentage of Mothers with Higher Education (Displaced Students)**: Proportion of displaced students whose mother has completed a higher education degree.

8. **Percentage of Displaced Students**: Proportion of students enrolled in institutions outside their habitual region of residence.

8.9 Impact of the +Superior Program: Conditions for +Superior Grant Eligibility

A student is eligible for a new +Superior grant if they meet all the following conditions:

1. They are enrolled, in the academic year of the grant, in a public higher education institution located in a NUTS III region covered by the +Superior Program.

2. They have submitted an application for a general social support study grant by the time they apply for the +Superior grant.

3. They have been awarded a social support study grant in the academic year in which they apply for the +Superior grant.

4. They habitually reside in a municipality that is *not* part of the same NUTS III region in which the organizational unit of their institution is located.

5. They have not had a +Superior grant cancelled or annulled in a previous academic year.

6. They are enrolled in an initial cycle of higher education (including CTeSP, Bachelor's, Integrated Master's, or Master's programs). [6]

8.10 Impact of the +Superior Program: DiD Results

[6] When the program was created in 2014, it only included Bachelor's and Integrated Master's degrees. CTeSP were added in 2016, and Master's programs were included in 2023.

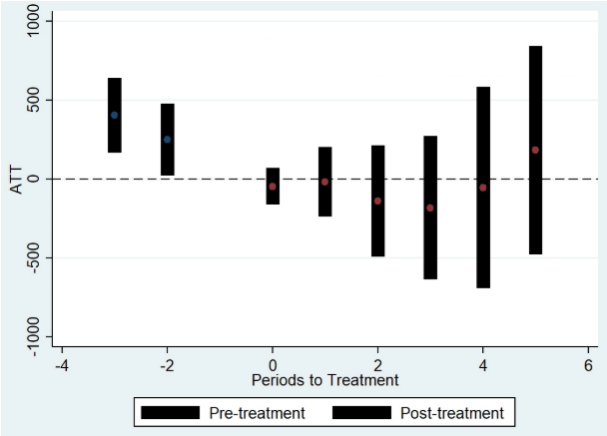


Figure A2: Effects of the +Superior Program on Enrollment — Event Study

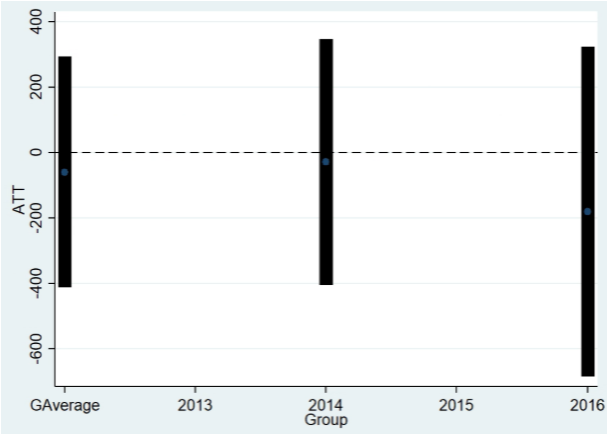


Figure A3: Effects of the +Superior Program on Enrollment — Group Effects

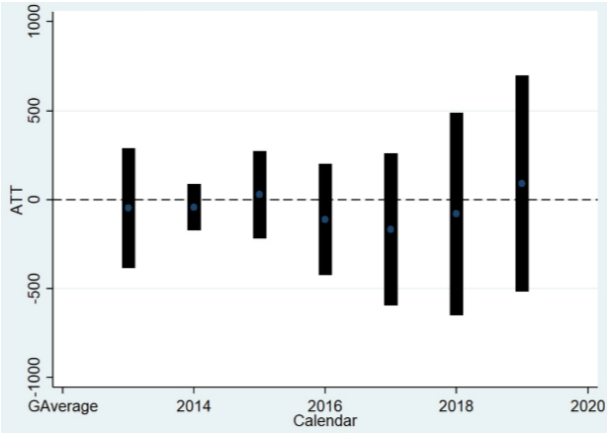


Figure A4: Effects of the +Superior Program on Enrollment — Calendar Effects

Table A8: Effects of the +Superior Program on Enrollment

Event Study	Coef.	Standard Error	[95%] CI
-3	404.17	120.96	[167.10 , 641.24]
-2	250.03	116.89	[20.93 , 479.14]
0	-45.64	60.01	[-163.26 , 71.97]
1	-18.21	113.13	[-239.94 , 203.52]
2	-138.43	180.16	[-491.55 , 214.68]
3	-182.47	232.22	[-637.61 , 272.66]
4	-53.13	325.66	[-691.42 , 585.15]
5	182.92	337.71	[-478.98 , 844.81]
Group Effects	**Coef.**	**Standard Error**	**[95%] CI**
2014	-28.55	191.87	[-404.61 , 347.52]
2016	-179.89	257.65	[-684.87 , 325.09]
Calendar Time Effects	**Coef.**	**Standard Error**	**[95%] CI**
2014	-43.48	66.10	[-173.04 , 86.08]
2015	27.44	126.12	[-219.75 , 274.62]
2016	-111.83	160.34	[-426.09 , 202.42]
2017	-167.20	218.18	[-594.82 , 260.42]
2018	-79.97	291.04	[-650.39 , 490.46]
2019	90.90	310.09	[-516.66 , 698.66]

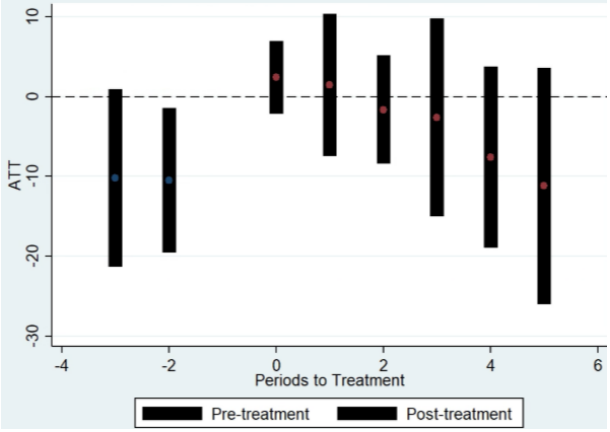


Figure A5: Effects of the +Superior Program on the % of Displaced Students — Event Study

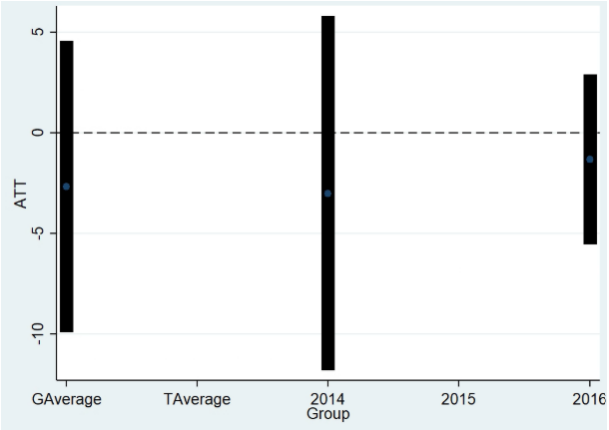


Figure A6: Effects of the +Superior Program on the % of Displaced Students — Group Effects

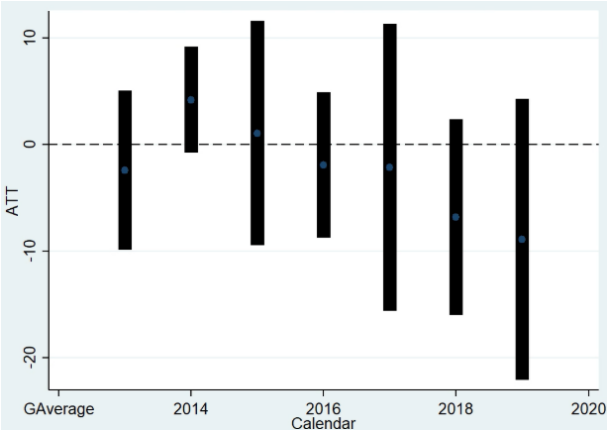


Figure A7: Effects of the +Superior Program on the % of Displaced Students — Calendar Effects

Table A9: Effects of the +Superior Program on the Percentage of Displaced Students

Event Study	Coef.	Standard Error	[95%] CI
-3	-10.179	5.673	[-21.29 , 0.94]
-2	-10.487	4.622	[-19.55 , -1.43]
0	2.386	2.342	[-2.20 , 6.98]
1	1.426	4.538	[-7.47 , 10.32]
2	-1.633	3.479	[-8.45 , 5.19]
3	-2.633	6.339	[-15.06 , 9.79]
4	-7.605	5.788	[-18.95 , 3.74]
5	-11.190	7.561	[-26.01 , 3.63]
Group Effects	**Coef.**	**Standard Error**	**[95%] CI**
2014	-3.008	4.485	[-11.8 , 5.78]
2016	-1.319	2.154	[-5.54 , 2.90]
Calendar Time Effects	**Coef.**	**Standard Error**	**[95%] CI**
2014	4.215	2.523	[-0.73 , 9.16]
2015	1.065	5.364	[-9.45 , 11.58]
2016	-1.906	3.470	[-8.71 , 4.89]
2017	-2.132	6.871	[-15.59 , 11.33]
2018	-6.799	4.679	[-15.97 , 2.37]
2019	-8.880	6.726	[-22.06 , 4.30]

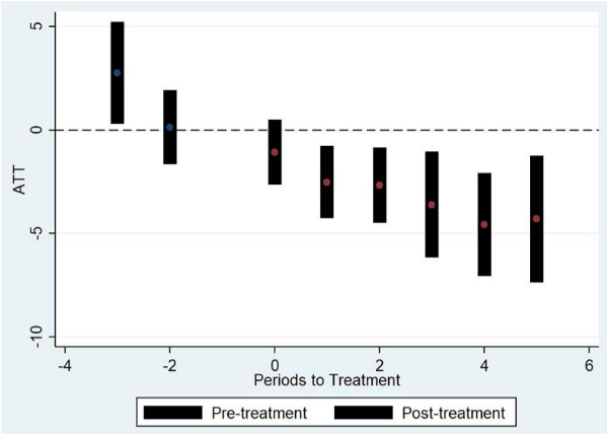


Figure A8: Effects of the +Superior Program on Entry Grades — Event Study

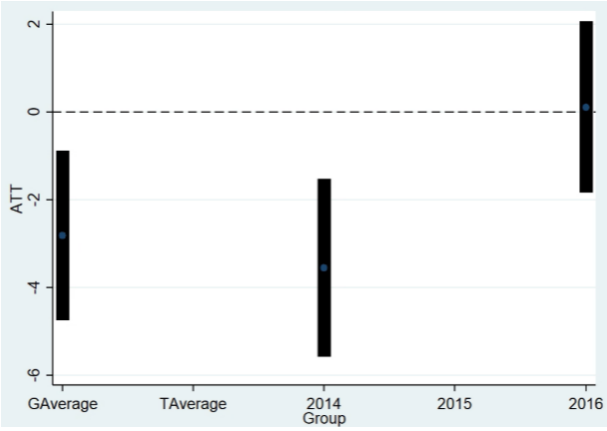


Figure A9: Effects of the +Superior Program on Entry Grades — Group Effects

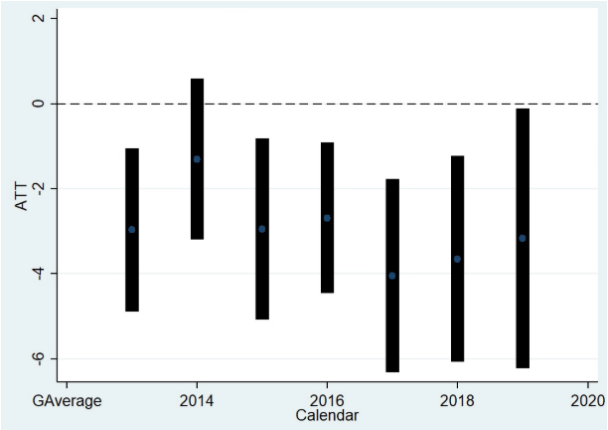


Figure A10: Effects of the +Superior Program on Entry Grades — Calendar Effects

Table A10: Effects of the +Superior Program on Entry Grades

Event Study	Coef.	Standard Error	[95%] CI
-3	2.7592	1.2554	[0.3 , 5.21]
-2	0.1286	0.9126	[-1.66 , 1.91]
0	-1.0694	0.8011	[-2.64 , 0.50]
1	-2.5198	0.8959	[-4.27 , -0.76]
2	-2.6563	0.9274	[-4.47 , -0.83]
3	-3.6095	1.3077	[-6.17 , -1.04]
4	-4.5616	1.2704	[-7.05 , -2.07]
5	-4.3031	1.5713	[-7.38 , -1.22]
Group Effects	**Coef.**	**Standard Error**	**[95%] CI**
2014	-3.5487	1.0341	[-5.57 , -1.52]
2016	0.1087	0.9959	[-1.84 , 2.06]
Calendar Time Effects	**Coef.**	**Standard Error**	**[95%] CI**
2014	-1.3000	0.9653	[-3.19 , 0.59]
2015	-2.9517	1.0869	[-5.08 , -0.82]
2016	-2.6853	0.9058	[-4.46 , -0.90]
2017	-4.0440	1.1601	[-6.31 , -1.76]
2018	-3.6497	1.2335	[-6.06 , -1.23]
2019	-3.1675	1.5568	[-6.21 , -0.11]

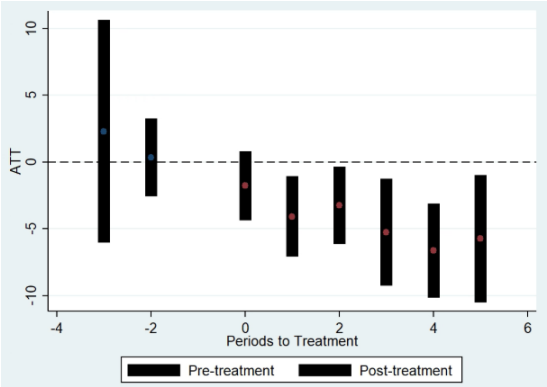


Figure A11: Effects of the +Superior Program on Entry Grades of Displaced Students — Event Study

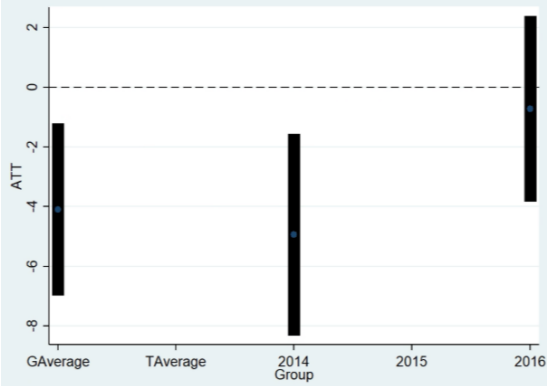


Figure A12: Effects of the +Superior Program on Entry Grades of Displaced Students — Group Effects

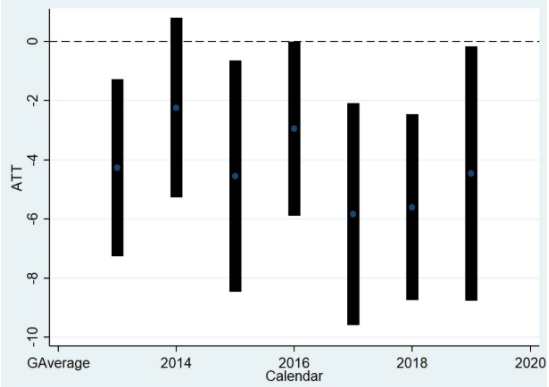


Figure A13: Effects of the +Superior Program on Entry Grades of Displaced Students — Calendar Effects

Table A11: Effects of the +Superior Program on the Entry Grades of Displaced Students

Event Study	Coef.	Standard Error	[95%] CI
-3	2.28	4.26	[-6.07 , 10.63]
-2	0.33	1.49	[-2.61 , 3.26]
0	-1.78	1.32	[-4.36 , 0.81]
1	-4.09	1.54	[-7.11 , -1.07]
2	-3.26	1.49	[-6.17 , -0.35]
3	-5.27	2.04	[-9.27 , -1.26]
4	-6.65	1.80	[-10.18 , -3.11]
5	-5.75	2.43	[-10.52 , -0.99]
Group Effects	**Coef.**	**Standard Error**	**[95%] CI**
2014	-4.94	1.73	[-8.33 , -1.56]
2016	-0.73	1.58	[-3.83 , 2.38]
Calendar Time Effects	**Coef.**	**Standard Error**	**[95%] CI**
2014	-2.25	1.55	[-5.28 , 0.79]
2015	-4.56	2.00	[-8.47 , -0.65]
2016	-2.96	1.50	[-5.90 , -0.01]
2017	-5.84	1.91	[-9.60 , -2.09]
2018	-5.61	1.60	[-8.75 , -2.46]
2019	-4.47	2.20	[-8.77 , -1.16]

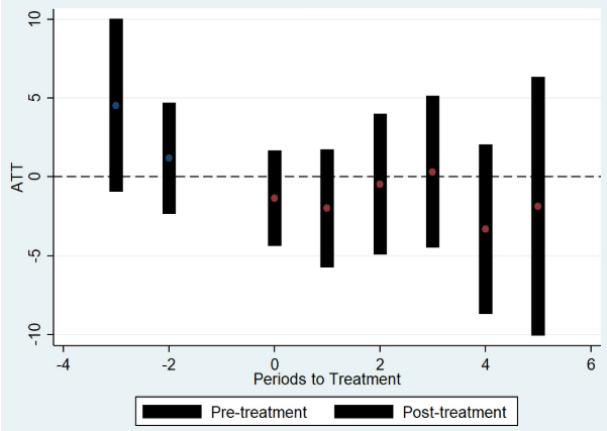


Figure A14: Effects of the +Superior Program on the Percentage of Fathers with HE — Event Study

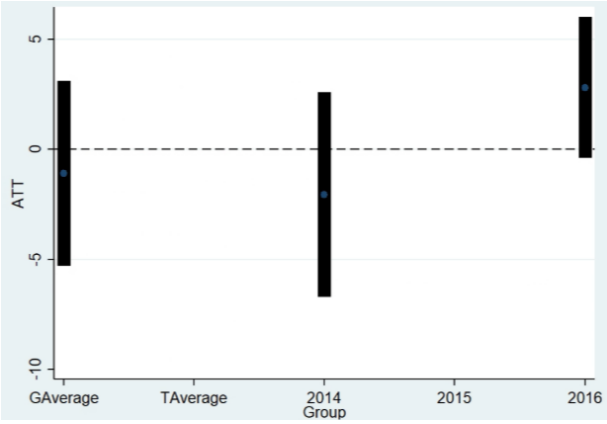


Figure A15: Effects of the +Superior Program on the Percentage of Fathers with HE — Group Effects

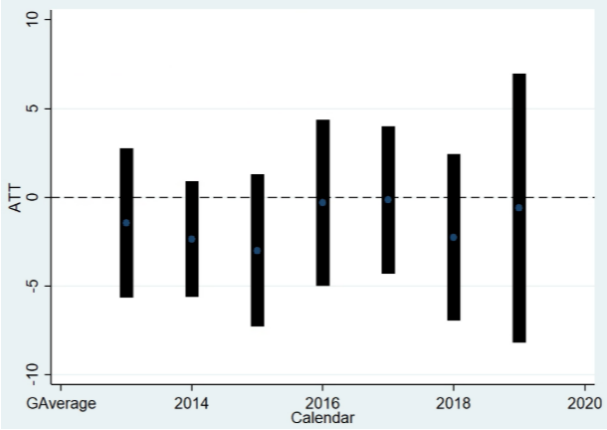


Figure A16: Effects of the +Superior Program on the Percentage of Fathers with HE — Calendar Effects

Table A12: Effects of the +Superior Program on the Percentage of Fathers with Higher Education

Event Study	Coef.	Standard Error	[95%] CI
-3	4.5255	2.7989	[-0.96, 10.01]
-2	1.1810	1.7978	[-2.34, 4.70]
0	-1.3402	1.5444	[-4.36, 1.66]
1	-1.9869	1.9104	[-5.73, 1.75]
2	-0.4675	2.2807	[-4.99, 4.00]
3	0.3284	2.4550	[-4.48, 5.14]
4	-3.3227	2.7433	[-8.7, 2.05]
5	-1.8649	4.1833	[-10.06, 6.33]
Group Effects	**Coef.**	**Standard Error**	**[95%] CI**
2014	-2.0543	2.3770	[-6.71, 2.60]
2016	2.8055	1.6334	[-0.39, 6.00]
Calendar Time Effects	**Coef.**	**Standard Error**	**[95%] CI**
2014	-2.3589	1.6609	[-5.61, 0.89]
2015	-3.0002	2.1954	[-7.30, 1.30]
2016	-0.3135	2.3956	[-5.01, 4.38]
2017	-1.1495	2.1246	[-4.31, 4.01]
2018	-2.2660	2.4036	[-6.98, 2.44]
2019	-0.6008	3.8716	[-8.18, 6.98]

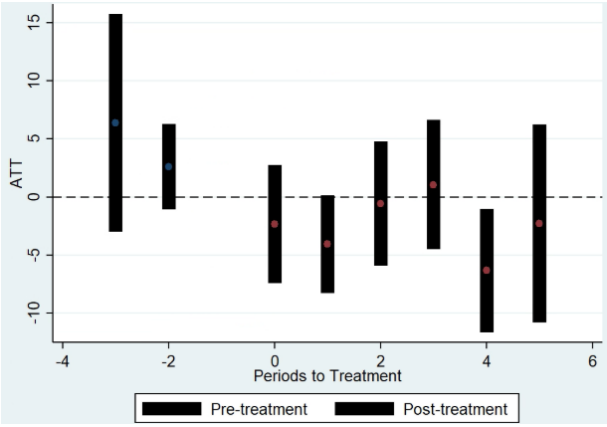


Figure A17: Effects of the +Superior Program on the Percentage of Fathers with HE Among Displaced Students — Event Study

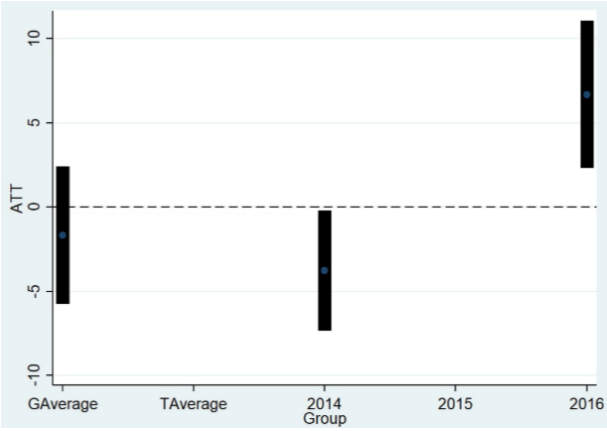


Figure A18: Effects of the +Superior Program on the Percentage of Fathers with HE Among Displaced Students — Group Effects

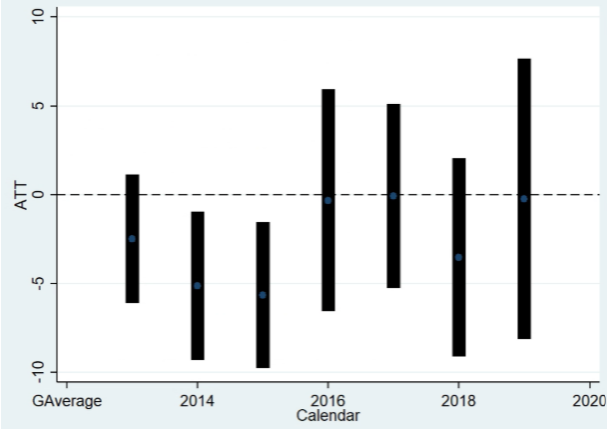


Figure A19: Effects of the +Superior Program on the Percentage of Fathers with HE Among Displaced Students — Calendar Effects

Table A13: Effects of the +Superior Program on the Percentage of Fathers with Higher Education Among Displaced Students

Event Study	Coef.	Standard Error	[95%] CI
-3	6.369571	4.770755	[-2.98 , 15.72]
-2	2.625892	1.874993	[-1.05 , 6.3]
0	-2.331947	2.587797	[-7.40 , 2.74]
1	-4.058258	2.152315	[-8.2 , 0.16]
2	-0.5834716	2.726828	[-5.92 , 4.76]
3	1.056973	2.844159	[-4.51 , 6.63]
4	-6.313769	2.713054	[-11.63 , -0.996]
5	-2.27516	4.342206	[-10.78 , 6.23]
Group Effects	**Coef.**	**Standard Error**	**[95%] CI**
2014	-3.779632	1.829271	[-7.36 , -0.19]
2016	6.692985	2.230042	[2.32 , 11.06]
Calendar Time Effects	**Coef.**	**Standard Error**	**[95%] CI**
2014	-5.139057	2.137543	[-9.32 , -0.94]
2015	-5.655217	2.093447	[-9.75 , -1.55]
2016	-0.3186566	3.195488	[-6.5 , 5.94]
2017	-0.718018	2.642599	[-5.25, 5.10]
2018	-3.536532	2.847481	[-9.11 , 2.04]
2019	-0.2254373	4.03109	[-8.12 , 7.67]

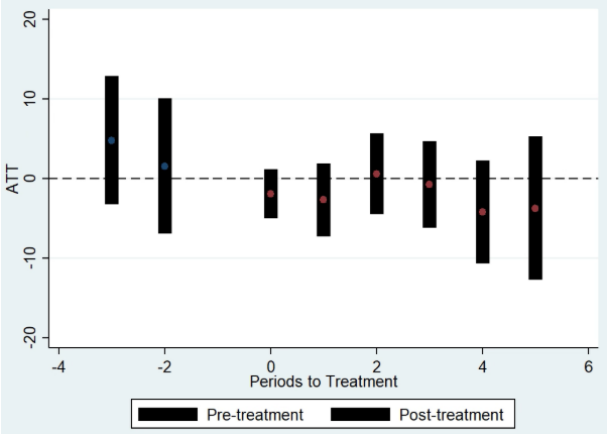


Figure A20: Effects of the +Superior Program on the Percentage of Mothers with HE — Event Study

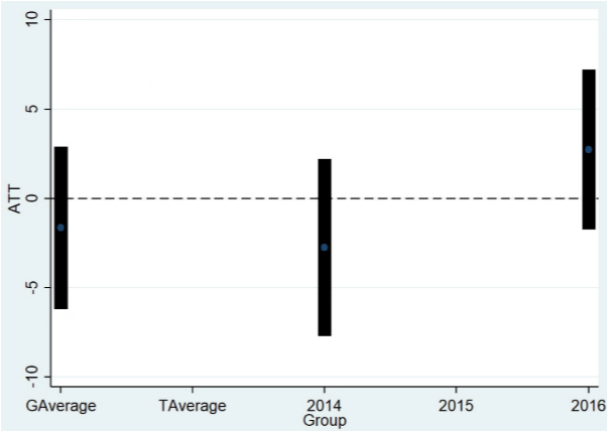


Figure A21: Effects of the +Superior Program on the Percentage of Mothers with HE — Group Effects

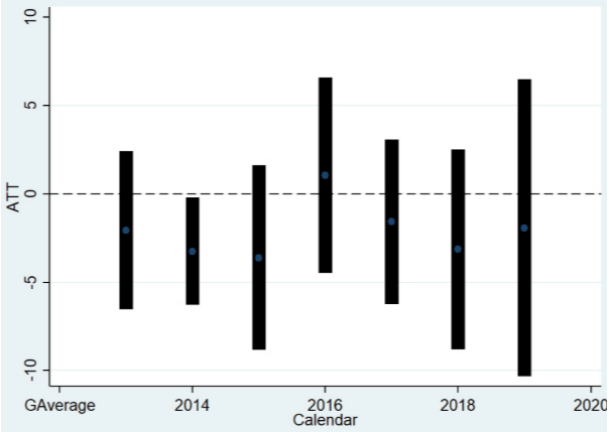


Figure A22: Effects of the +Superior Program on the Percentage of Mothers with HE — Calendar Effects

Table A14: Effects of the +Superior Program on the Percentage of Mothers with Higher Education

Event Study	Coef.	Standard Error	[95%] CI
-3	4.803	4.116	[-3.265, 12.871]
-2	1.591	4.353	[-6.942, 10.123]
0	-1.902	1.583	[-5.005, 1.201]
1	-2.669	2.339	[-7.254, 1.915]
2	0.596	2.590	[-4.481, 5.672]
3	-0.740	2.773	[-6.175, 4.694]
4	-4.186	3.296	[-10.648, 2.275]
5	-3.710	4.611	[-12.748, 5.327]
Group Effects	**Coef.**	**Standard Error**	**[95%] CI**
2014	-2.754	2.529	[-7.710, 2.202]
2016	2.731	2.286	[-1.749, 7.212]
Calendar Time Effects	**Coef.**	**Standard Error**	**[95%] CI**
2014	-3.239	1.553	[-6.283, -1.195]
2015	-3.613	2.664	[-8.835, 1.610]
2016	1.066	2.823	[-4.467, 6.598]
2017	-1.576	2.372	[-6.226, 3.073]
2018	-3.129	2.889	[-8.793, 2.534]
2019	-1.912	4.290	[-10.321, 6.496]

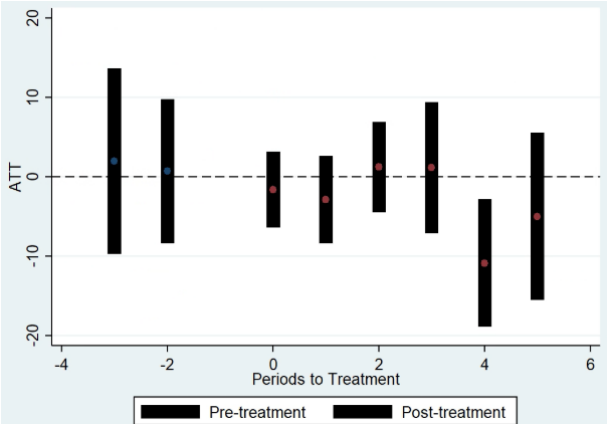


Figure A23: Effects of the +Superior Program on the Percentage of Mothers with HE among Displaced Students — Event Study

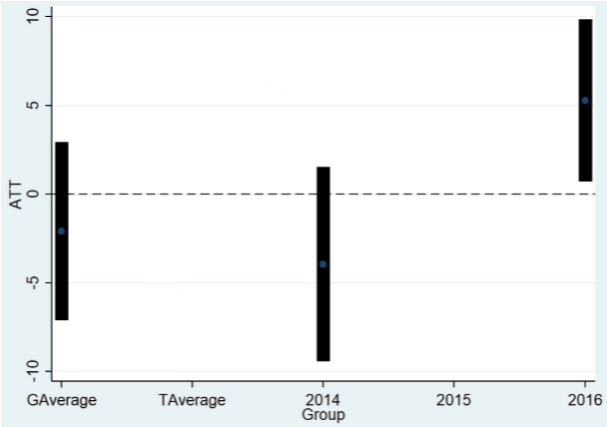


Figure A24: Effects of the +Superior Program on the Percentage of Mothers with HE among Displaced Students — Group Effects

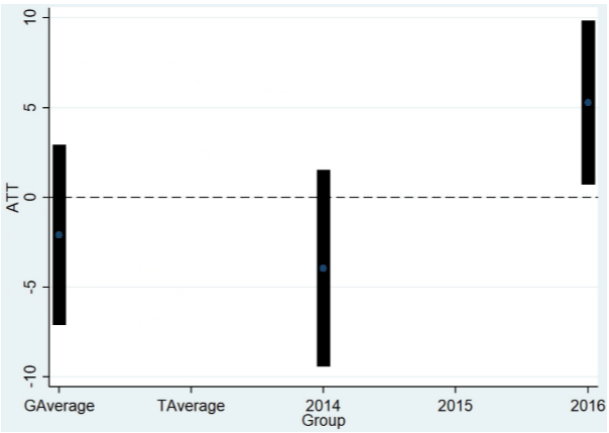


Figure A25: Effects of the +Superior Program on the Percentage of Mothers with HE among Displaced Students — Calendar Effects

Table A15: Effects of the +Superior Program on the Percentage of Mothers with Higher Education among Displaced Students

Event Study	Coef.	Standard Error	[95%] CI
-3	2.010056	5.972313	[-9.69, 13.71]
-2	0.7178116	4.651391	[-8.39, 9.83]
0	-1.614013	2.457806	[-6.43, 3.20]
1	-2.879853	2.816643	[-8.40, 2.640
2	1.247441	2.906647	[-4.44, 6.94]
3	1.154675	4.241666	[-7.15, 9.46]
4	-10.85465	4.118847	[-18.92, -2.78]
5	-4.975052	5.387888	[-15.53, 5.58]
Group Effects	Coef.	Standard Error	[95%] CI
2014	-3.95405	2.80034	[-9.44, 1.53]
2016	5.279905	2.32888	[0.71, 9.84]
Calendar Time Effects	Coef.	Standard Error	[95%] CI
2014	-4.386596	2.043966	[-8.39, -0.38]
2015	-4.153448	3.377566	[-10.77, 2.46]
2016	3.196979	3.207086	[-3.088, 9.48]
2017	-0.3424498	3.964272	[-8.11, 7.42]
2018	-8.737996	3.668598	[-15.92, -1.54]
2019	-2.040012	5.014655	[-11.86, 7.78]